In the Claims

Please amend the claims as follows:

Claim 1 (cancelled)

Claim 2 (previously presented): The micro-electro-mechanical optical apparatus of Claim 6 wherein the optical element is constructed of single crystal silicon.

Claim 3 (cancelled)

Claim 4 (previously presented): The micro-electro-mechanical optical apparatus of Claim 6 wherein said damping element comprises a damping means.

Claim 5 (previously presented): The micro-electro-mechanical optical apparatus of Claim 6 wherein said damping element comprises a coating of a damping agent applied to the serpentine hinges.

Claim 6 (previously presented): A micro-electro-mechanical optical apparatus comprising:

an optical element capable of motion in at least one degree of freedom wherein the motion in the at least one degree of freedom is enabled by serpentine hinges configured to enable the optical element to move in the at least one degree of freedom;

driving elements configured to deflect the optical element in said at least one degree of freedom to controllably induce deflection in the optical element; and

damping element;

wherein said damping element comprises the serpentine hinges configured to reduce a magnitude of resonances.

Claim 7 (previously presented): A micro-electro-mechanical

optical apparatus as in Claim 6 wherein the optical element includes at least one reflective surface.

Claim 8 (previously presented): A reflector array comprising a plurality of micro-electro-mechanical optical apparatus as described in Claim 6.

Claim 9 (cancelled)

Claim 10 (previously presented): A micro-electro-mechanical optical apparatus as in Claim 6 wherein the optical apparatus is incorporated into a wavelength router having an optical cross-connect switch and a wavelength division multiplexer.

Claims 11-21 (cancelled)

Claim 22 (previously presented): A micro-electro-mechanical optical apparatus comprising:

a support structure having a plurality of optical device assemblies formed thereon, wherein the optical device assemblies include:

a movable optical element having an outside edge joined to the support structure using a pair of serpentine hinges, wherein the serpentine hinges comprise at least one arm; and

driving elements positioned such that activation of the driving elements can controllably induce deflection in the movable optical element;

wherein each arm of each winding of each serpentine hinge extends in a direction transverse to the axis of rotation defined by the pair of serpentine hinges and wherein each arm is generally contoured to coincide with the shape of the outside edge of the mirror thereby defining circumferentially curved serpentine hinges.

Claim 23 (previously presented): A micro-electro-mechanical optical apparatus as in Claim 22 wherein a proximal portion of each arm of each winding of each serpentine hinge includes a proximal fold which shapes the proximal

portion of each arm such that it extends in a direction substantially parallel to an axis of rotation defined by the pair of serpentine hinges.

Claim 24 (previously presented): A micro-electro-mechanical optical apparatus comprising:

a support structure having a plurality of optical device assemblies formed thereon, wherein the optical device assemblies include:

a movable optical element having an outside edge joined to the support structure using a pair of serpentine hinges;

driving elements positioned such that activation of the driving elements can controllably induce deflection in the movable optical element; and

a damping element;

wherein the serpentine hinges comprise at least one winding with each winding having two arms; and

wherein the movable optical element is formed in a material layer having a layer thickness and the pair of serpentine hinges are formed in the layer;

wherein the shape of the pair of serpentine hinges comprises the damping element.

Claim 25 (Cancelled)

Claim 26 (previously presented): A micro-electro-mechanical optical apparatus as in claim 24, wherein each of the serpentine hinges includes first and second ends, and wherein the length of each winding becomes progressively longer from the first end of each serpentine hinge to the second end of each serpentine hinge.

Claims 27-39 (cancelled)

Claim 40 (previously presented): A micro-electro-mechanical optical apparatus comprising:

a support structure having a plurality of bi-axial optical device assemblies formed thereon, wherein the biaxial optical device assemblies include:

a movable frame element having an inside periphery and an outside periphery;

the outside periphery of the movable frame element joined to the support structure using a first pair of serpentine hinges, the first pair of serpentine hinges defining a first axis of rotation about which the movable frame element can rotate;

a movable optical element having an outside periphery;

the outside periphery of the movable optical element joined to the movable frame element using a second pair of serpentine hinges, the second pair of serpentine hinges defining a second axis of rotation about which the movable optical element can rotate;

frame driving elements positioned such that activation of the frame driving elements can controllably induce deflection in the movable frame element, said deflection inducing rotation of the movable optical element about the first axis of rotation defined by the first pair of serpentine hinges;

optical element driving elements positioned such that activation of the optical element driving elements can controllably induce deflection in the movable optical element, said deflection inducing rotation of the movable optical element about the second axis of rotation defined by the second pair of serpentine hinges; and

a damping element;

wherein the movable optical element comprises a mirror having at least one reflective surface and

wherein the shape of the pairs of the first and second serpentine hinges comprise the damping element.

Claims 41-42 (Cancelled)

Claim 43 (original): A micro-electro-mechanical optical apparatus comprising:

a support structure having a plurality of bi-axial optical device assemblies formed thereon, wherein the bi-axial optical device assemblies include:

a first movable frame element having an inside periphery and an outside periphery;

a second movable frame element having an inside periphery and an outside periphery;

a third movable frame element having an inside periphery and an outside periphery;

a movable optical element having an outside periphery;

the outside periphery of the first movable frame element joined to the support structure using a first pair of serpentine hinges, the first pair of serpentine hinges defining a first axis of rotation about which the first movable frame element can rotate;

the outside periphery of the second movable frame element joined to the inside periphery of the first movable frame using a first pair of torsional hinges which defines a first torsional axis of rotation about which the second movable frame element can rotate, the first torsional axis of rotation is substantially parallel to the first axis of rotation about which the first movable frame element can rotate;

the outside periphery of the third movable frame element joined to the inside periphery of the second movable frame using a second pair of serpentine hinges which define a second axis of rotation about which the third movable frame element can rotate, the second axis of rotation being transverse to the first axis of rotation;

the outside periphery of the movable optical element joined to the third movable frame element using a second pair of torsional hinges which defines a second torsional axis of rotation about which the optical element can rotate, the second torsional axis of rotation is transverse to the first axis of rotation and to the first torsional axis of rotation;

first frame driving elements positioned such that activation of the first frame driving elements can controllably induce deflection in the first movable frame element, said deflection inducing rotation of the first movable optical element about the first axis of

rotation defined by the first pair of serpentine hinges;

second frame driving elements positioned such that activation of the second frame driving elements can controllably induce deflection in the second movable frame element, said deflection inducing rotation of the second movable optical element about the first torsional axis of rotation defined by the first pair of torsional hinges;

third frame driving elements positioned such that activation of the third frame driving elements can controllably induce deflection in the third movable frame element, said deflection inducing rotation of the third movable frame element about the second axis of rotation defined by the second pair of serpentine hinges;

optical element driving elements positioned such that activation of the optical element driving elements can controllably induce deflection in the movable optical element, said deflection inducing rotation of the movable optical element about the second torsional axis of rotation defined by the second pair of torsional hinges; and

a damping element.

Claim 44 (original): A micro-electro-mechanical optical apparatus as in Claim 43 wherein the movable optical element comprises a mirror having at least one reflective surface.

Claim 45 (original): A plurality of micro-electro-mechanical optical apparatuses as in Claim 44 wherein the plurality of micro-electro-mechanical optical apparatuses define reflector assemblies and wherein the reflector assemblies are organized in a two dimensional MxN reflector array.

Claim 46 (original): A micro-electro-mechanical optical apparatus as in Claim 43 wherein the movable optical element is selected from a group consisting of filters, blockers,

gratings, and lenses.

Claim 47 (original): A micro-electro-mechanical optical apparatus as in Claim 44 wherein the damping element comprises a layer of a damping agent formed on at least one of the first and second pairs of serpentine hinges and first and second pairs of torsional hinges.

Claim 48 (original): A micro-electro-mechanical optical apparatus as in Claim 47 wherein the damping agent comprises a polymeric material.

Claim 49 (original): A micro-electro-mechanical optical apparatus as in Claim 44 wherein each of the first and second pairs of serpentine hinges comprise at least one winding with each winding having two arms.

Claim 50 (original): A micro-electro-mechanical optical apparatus as in Claim 49 wherein each arm of each winding of each of the first pair of serpentine hinges extends in a direction transverse to the axis of rotation defined by the first pair of serpentine hinges, and

wherein each arm of each winding of each of the second pair of serpentine hinges extends in a direction transverse to the axis of rotation defined by the second pair of serpentine hinges.

Claim 51 (previously presented): A micro-electro-mechanical optical apparatus as in Claim 50 wherein each arm of each winding of each first serpentine hinge extends in a direction transverse to the axis of rotation defined by the first pair of serpentine hinges and wherein each arm of the first serpentine hinge is generally contoured to coincide with the shape of the outside periphery of the first frame element; and

wherein each arm of each winding of each second serpentine hinge extends in a direction transverse to the axis of rotation defined by the second pair of serpentine hinges and wherein each arm of the second serpentine hinge is generally contoured to coincide

with the shape of the outside periphery of the mirror.

Claim 52-73 (cancelled)